

Business Trip to Greece, Thessaloniki

Topic: Waste and recycling management, 17-20 February 2020

Title of the presentation:

Increasing the efficiency of biogas plants -

Digestion of straw-like biomass with the **BMT** System[®]

Matthias Wackerbauer
CEO and owner

VISIT...

LANZAROTE
Caliente.COM

Introduction MWK Bionik[®] Group

Company Philosophy



Matthias Wackerbauer

Founder and CEO MWK Bionik® GmbH

„The greatest potential lies in a clever combination of biology and technology. We use bionics to actively protect our environment.“

The MWK Bionik® Group



Manufacturer for microbiological end-user products



*BMT-System®:
Fermentation of straw-like biomass*



*Microbial remediation of contaminants –
elimination of pollutants*



*Environmental laboratory - accredited, certified,
notified; Biogas consulting, biogas products*

Company profile



- 2005** Foundation of MWK GmbH
- 2013** Change of name to MWK Bionik® GmbH
- 2015** Purchase of Environmental laboratory Uphoff GmbH (founded in 1989)
- 3.500** Regular customers
- 2.1** Mio € turnover in 2019
- 1.650** m² think tank
- 34** well-trained employees (PhD, graduate engineers, MSc., technical assistants, etc.)
- 15** Patents in 5 patent families
- 1** Philosophy

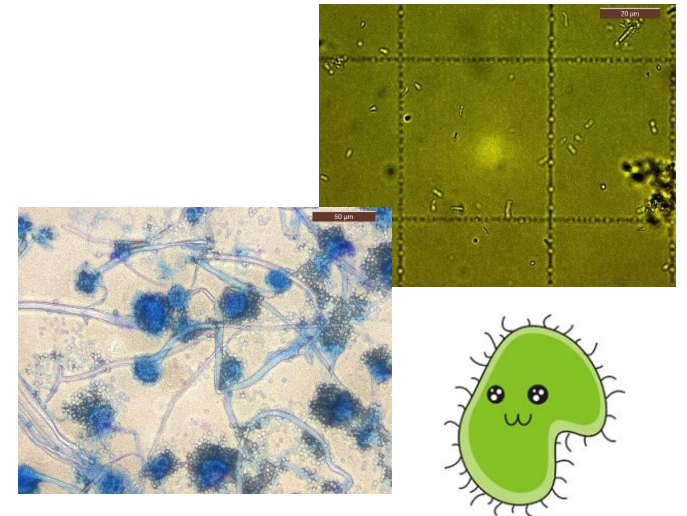
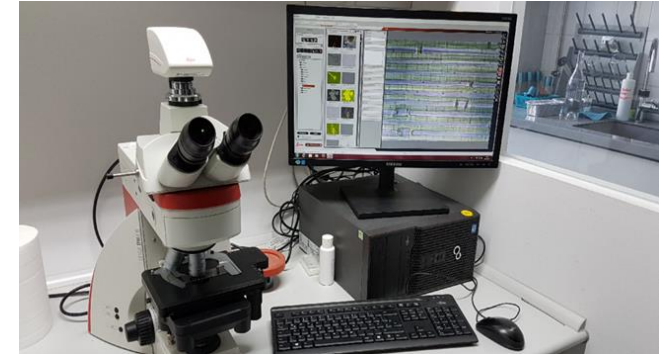
• Bad Endorf



Know-how of the MWK Bionik® Group



- Experience and **know-how** from 30 years
- **Digestion of straw-like biomass** with specialized microorganisms (no high pressure! no temperatures > 100°C!)
- **Remediation of contaminated sites, wastewater and waste** treatment with highly efficient microorganisms
- Analytics (soil, biogas, etc.) in our **own laboratory Uphoff Lab**
- The basis of all products: an adaptable community of **natural, risk-free and highly efficient microorganisms**



Possible business partners



- Municipalities that wish to use existing biomass for energy purposes (biogas plant + BMT system)
- Prefectures (e.g. Athens) interested in using residual waste and/or biomass for energy production (biogas plant with/without BMT system)
- Existing biogas plants interested in efficient straw fermentation (extension of a biogas plant with the BMT system)



The **BMT** System^{®*}

*** European patent with the patent number 3114208**

Mission for the BMT System®



+



⇒ ?!

Straw would be a good biogas substrate, but is difficult to ferment in biogas plants

→ The BMT System® makes straw usable for biogas plants

Pretreatment of input substrate



Physical



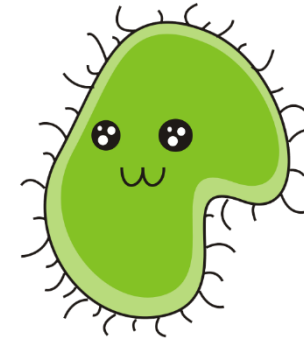
- Mechanical shear
- Heat
- Pressure
- Electric fields

Chemical



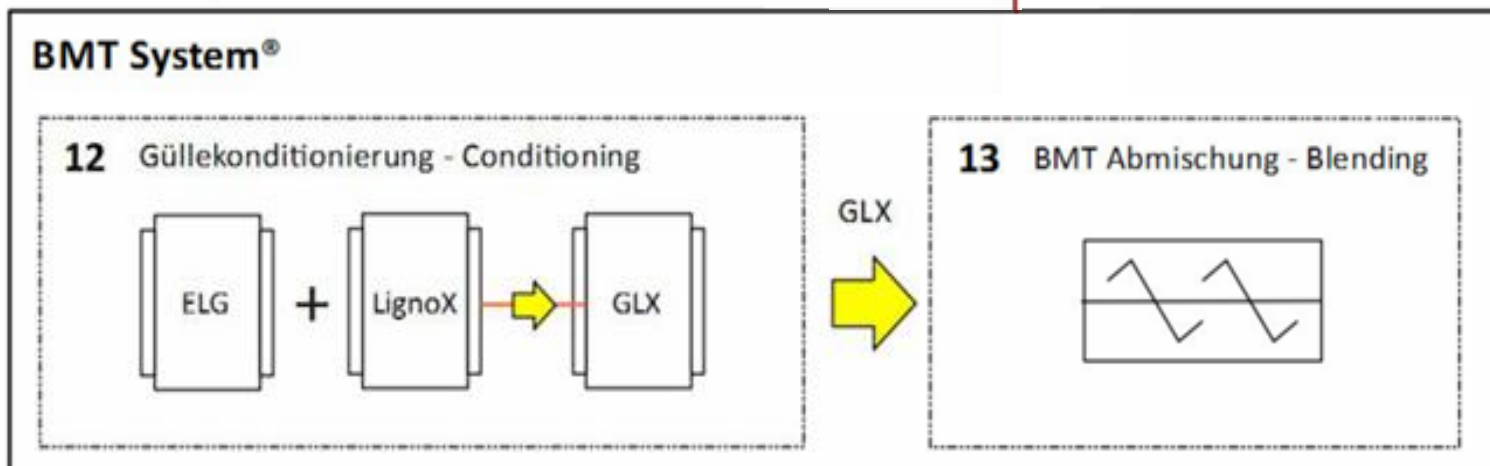
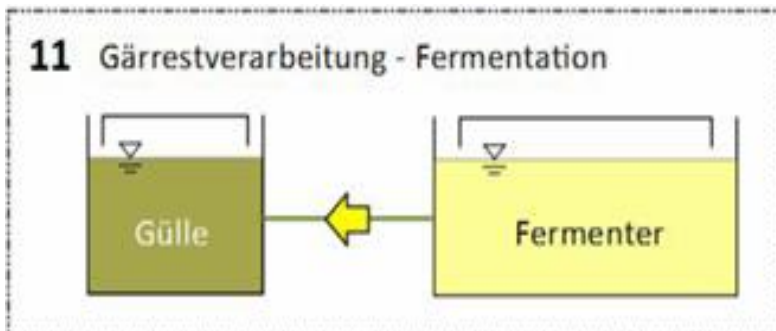
- Acids
- Bases
- Solvents

Biological

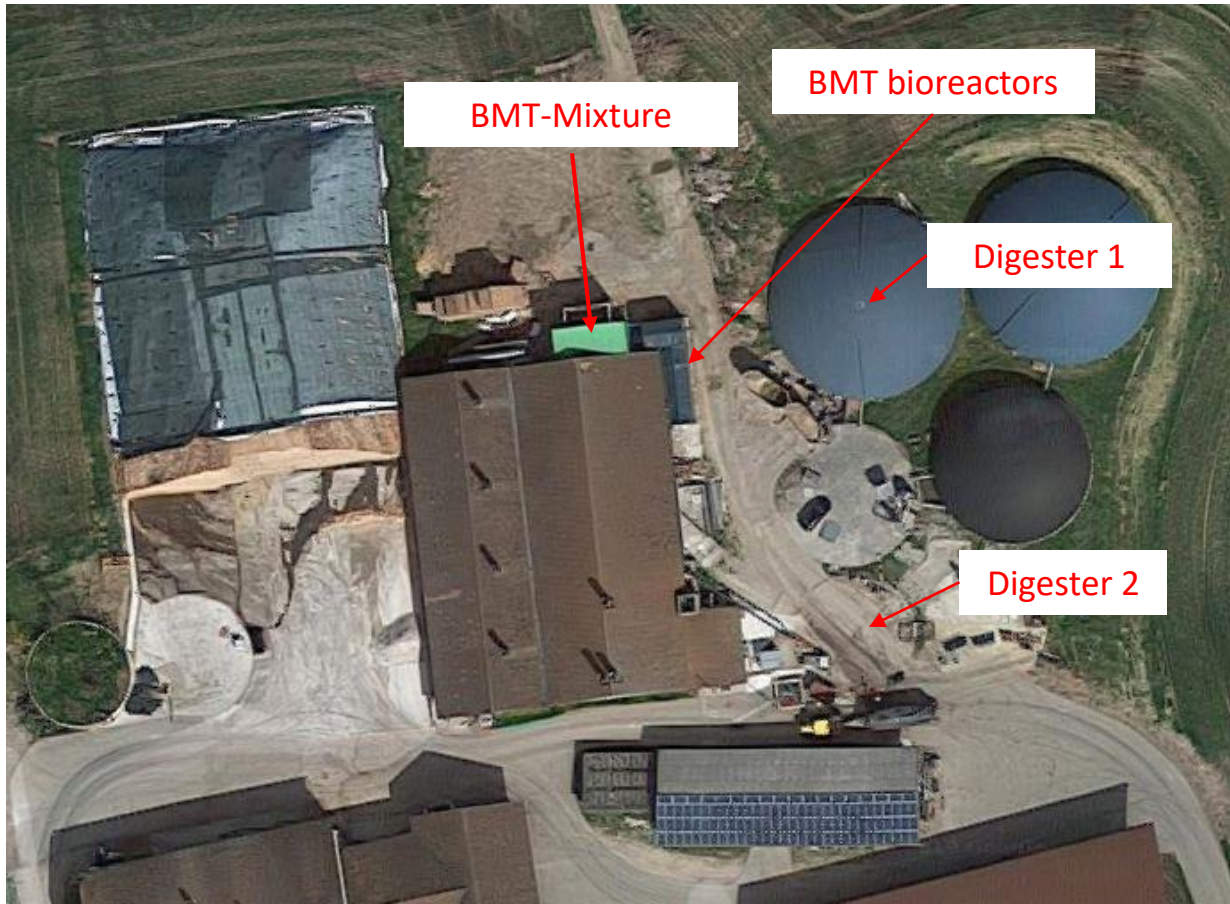


- Enzymatic
- Microbiological

Technical implementation



Pictures of BMT System®



Aerial picture of the reference plant
Source: Google Maps

Pictures of BMT System®



BMT System® und biogas plant



Bioreactors: three-step heating

Pictures of BMT System®



Straw storage



Strawfeeder with automatic
cord remover



Mixture of liquid digestate with
straw

Pictures of BMT System®



BMT-product für biogas plant



BEFORE



AFTER



→ Result: Biogas from straw

Practical experience from the reference plant



Reference plant Suchy-Mussner, Biburg:

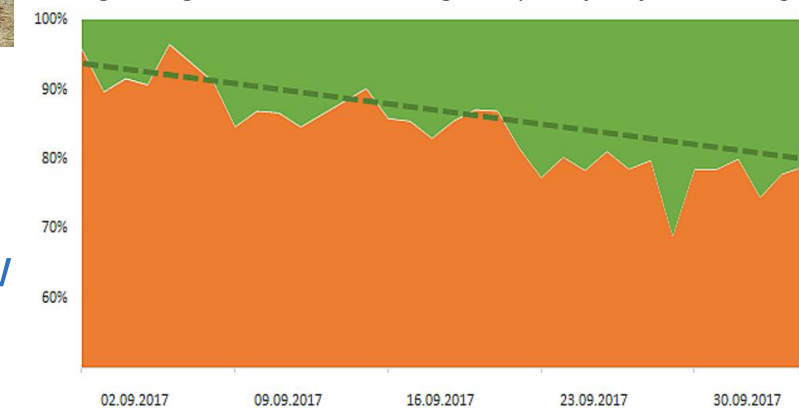
- **680 kW** installed capacity
- Continuous operation **BMT System®** for 2 years

Results:

- 1 t wheat straw odm produces approx. **720 m³ biogas**
- 1 t wheat straw (fresh mass) **replaces 2,9 t maize silage => 12-15 t maize silage per day is replaced**
- approx. **350 kW** or **70%** of the capacity is from input material straw



Tageseintrag oTS von Stroh und Maissilage – Daily ODM feed of straw and silage



Advantages and consumption



Utilization of **hardly fermentable, lignin-containing** residues from agriculture

35-50% odm replaceable by straw

Double value: market fruit + energetic use

Repository biomass reactivation

Increase in plant output for existing plants

User-friendly operation and maintenance

Consumption per ton BMT-product:

Liquid digestate (dm max. 12%) = 500 - 700 kg

LignoX® additive = 1 kg

Straw (max. 13% humidity) = 500 kg

Power consumption 5 - 6% (electr.)

Pictures of constructed biogas plants – some examples (2000-2019)



Installed capacity: 1 MW



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Aerial pictures of biogas plants

Source: Matthias Wackerbauer

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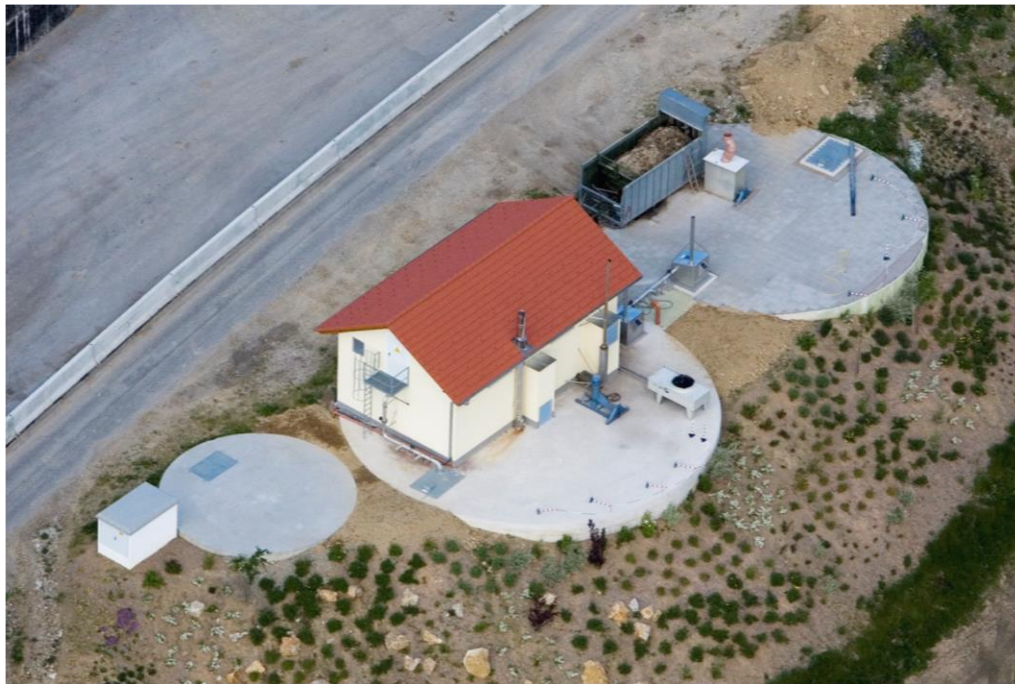


Installed capacity:1 MW

Aerial pictures of biogas plants

Source: Matthias Wackerbauer

Pictures of constructed biogas plants – some examples (2000-2019)



Installed capacity: 150 kW



Installed capacity: 2 x 250 kW

Aerial pictures of biogas plants

Source: Matthias Wackerbauer

Pictures of constructed biogas plants – some examples (2000-2019)



Installed capacity: 2.5 MW, waste fermentation plant

Aerial picture of biogas plant
Source: Matthias Wackerbauer

Microbial remediation of contaminants

Microbial remediation of contaminants

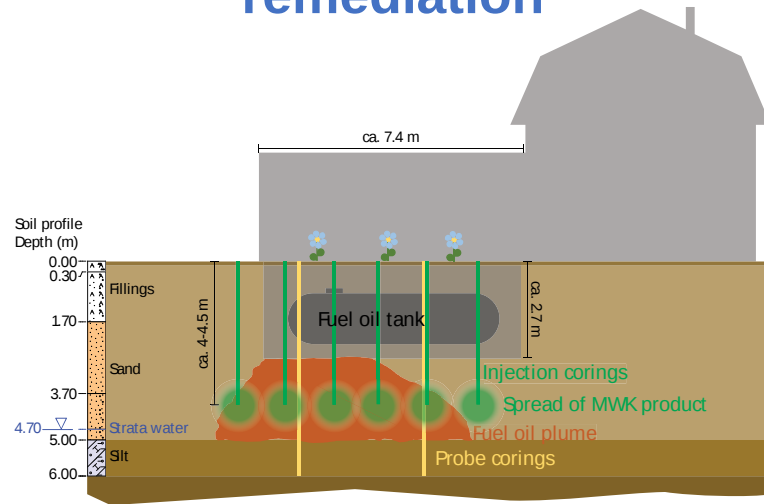


- Using the principles of ***enhanced natural attenuation***, we are able to decrease the duration of natural decontamination processes from ***years and decades*** to ***months and years*** through
 - Optimization of nutrient ratios
 - Adding the right microbes to the correct place
- Microbial bioremediation methods provide ***economical decontamination*** where conventional methods are not viable
- MWK provides ***custom, environmentally safe products and solutions*** for each remediation project

Microbial remediation of contaminants

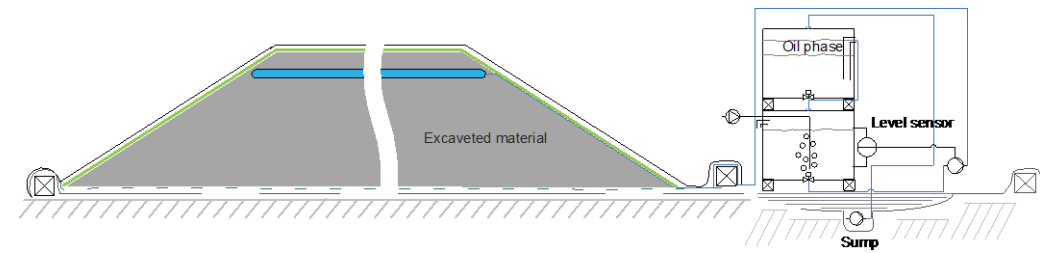


Subsurface plume remediation



In situ-treatment of contaminants plumes saves excavation and demolition costs.

Treatment of excavated soil piles



Our products and solutions are also compatible to classic *ex situ*-treatments.

Thank you very much for your attention!

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